

# Nonlinear Testing-Based EMI Characterization of Wireless Communication Transmitter with Microwave Power Amplifier

Hongyu Du,

Fayu Wan,

Mordachev V.<sup>1</sup>,

Sinkevich E.<sup>1</sup>,

Xiaohe Chen,

Fontgalland G.,

Dinh-Thuan Do,

Ngoho S.,

Ravelo B.

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<sup>1</sup>Belarusian State University of Informatics and Radioelectronics, 6 P. Brovki Street, Minsk 220013 Belarus

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**Abstract:** An effective empirical method of EMI analysis for transceiver (Tx-Rx) system implemented with nonlinear (NL) microwave power amplifier (MPA) dedicated to wireless communication is developed. The nonlinearity is experimentally quantified by the MPA gain, P1dB, and third order intermodulation

component via spectral response around 2.4 GHz 802.11b IEEE frequency band. The proof-of-concept represents the Tx-Rx system environment for wireless communication. The considered test signal emulates synchronization and physical broadcast different channels of downlink communication signals under QPSK modulation. The error vector magnitude (EVM) and signal-to-noise-ratio (SNR) due to the microwave Tx-Rx transmission undesirable EMI effect are assessed. Without MPA, the EVM and SNR of various channels fluctuate within a small range. Because of MPA nonlinearity, EMI becomes awfully significant due to the intermodulation generating SNR 20-dB decrease.

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